Biotic Prediction

Building the Computational Technology Infrastructure
for Public Health and Environmental Forecasting

Quality Assurance Plan

BP-QAP-1.0

Task Agreement: GSFC-CT-1

April 8, 2002

Contents

1 Overview

1.1 Introduction

This project will develop the high-performance, computational technology infrastructure needed to analyze the past, present, and future geospatial distributions of living components of Earth environments. This involves moving a suite of key predictive, geostatistical biological models into a scalable, cost-effective cluster computing framework; collecting and integrating diverse Earth observational datasets for input into these models; and deploying this functionality as a Web-based service. The resulting infrastructure will be used in the ecological analysis and prediction of exotic species invasions. This new capability will be deployed at the USGS Midcontinent Ecological Science Center and extended to other scientific communities through the USGS National Biological Information Infrastructure program.

1.2 Document Overview

This document, the *Quality Assurance Plan*, describes our plan for monitoring the overall software development effort for quality and ensuring high quality is maintained for the software throughout the lifecycle.

Section 2 describes the Quality Assurance organization within the project and the roles and responsibilities that the personnel have with regard to Quality Assurance.

Section 3 describes specific QA activities that will contribute to the quality of the software.

Appendix A has a glossary of some terms and acronyms used in this document.

2 Organization and Resources

2.1 Personnel, Roles and Responsibilities

Quality Assurance Manager (QAM) A Quality Assurance Manager (QAM) will be responsible for overall quality assurance for the project.

Lead Developer Each configuration item (CI) will be assigned a Lead Developer. The Lead Developer will have responsibility for QA for the that CI.

Developer Each developer will be responsible for understanding and following the procedures and guidelines established for the project and following them.

3 Quality Assurance Activities

3.1 Process Monitoring

This is a relatively small project, with a very focused group of developers who will work closely together. The Quality Assurance Manager will work with the Lead Developer to ensure that the processes and standards defined are being followed.

3.1.1 Documentation Standards

The design documentation in the *Software Design Document* must be kept current with the actual software implementation. Similarly the *Software User's Guide* and the *Software Maintenance Manual* should always reflect the software itself.

At each major release, the QAM and Lead Developer will review the documents and identify areas that may need rework.

3.1.2 Configuration Management Procedures

As described in the *Configuration Management Plan*, the CVS repository will be used to hold all versions of the software. Upon committing new changes to the repository, developers will update the changelog to reflect the changes.

The QAM and Lead Developer will periodically review the CVS logs to ensure that CM procedures are being followed and documentation is appropriate for the changes being made.

3.1.3 Testing

The QAM and the Lead Developer will monitor the overall test program for the project. They will insure that:

- All tests in the Test Plan are performed.
- The software executes successfully and that all requirements are verified.
- If a test fails, insure that a discrepancy report is generated and assigned to the appropriate individual.
- Discrepancies are addressed according to priority and that sufficient testing — including any appropriate regression testing — is successfully executed to verify the fix.

3.2 Audits and Reviews

After the requirements have been developed, we will hold a formal **Software Requirements Review** (SRR) to review the requirements. At the SRR, we will present the requirements, obtain feedback, and facilitate the resolution of outstanding issues.

Preliminary Design will be followed with a formal **Preliminary Design Review** (PDR) to present the high-level design and the rationale for selecting specific design elements.

We intend to invite external experts (from the CT project in particular) to these reviews to get independent feedback on our products.

During software implementation, we anticipate informal walk-throughs and code inspections of software, for both newly developed modules and reused code from the previous prototyping and research activities. The Lead Developer will monitor these activities leading to conceptual integrity and producing a quality software product. They will also ensure compliance with standard software coding practices including code portability and sufficient inline documentation.

A Glossary

BP Biotic Prediction Project

CI Configuration Item

CT Computational Technologies project

CMP Configuration Management Plan

PDR Preliminary Design Review

QA Quality Assurance

QAM Quality Assurance Manager

QAP Quality Assurance Plan

SDD Software Design Document

SMM Software Maintenance Manual

SRR Software Requirements Review

SUG Software User's Guide